

**VIRTUAL HOUSE INTEGRATING WITH SPEECH AND FACE
RECOGNITION TECHNOLOGY (OPTOUR)**

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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LAPORAN AKHIR PROJEK SARJANA MUDA (PSM)**

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VIRTUAL HOUSE INTEGRATING WITH SPEECH AND FACE RECOGNITION
TECHNOLOGY (OPTOUR)

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This report is submitted in partial fulfilment of the requirements for the Bachelor of
Computer Science (Media Interactive)

FALCULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DECLARATION

I hereby declare that this project report entitled
**VIRTUAL HOUSE INTEGRATING WITH SPEECH AND FACE
RECOGNITION TECHNOLOGY (OPTOUR)**

is written by me and is my own effort and that no part has been plagiarized without
citations.

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DEDICATION

To my beloved parents, sisters, supervisor, lecturers and friends..

ACKNOWLEDGEMENTS

I would like to thank Assoc. Prof. Dr. Faaizah binti Shahbodin for giving assistant to complete this project successfully...

I would also like to thank my beloved parents who have been giving me support and motivation throughout my project.

ABSTRACT

The main objective of this project is to develop a virtual tour application with the integration of speech and face recognition technology to add in a different dimension of experiences to user. Speech recognition is used for the navigation while face detection is functioning as a head tracking element. Besides, the 3D modelled property that being introduced was a new property where construction still in progress. Therefore, the purpose of this project is to provide property developer of Rah Properties Corporation of a low cost and new way of promoting new residency projects. In order to cope with the current busy lifestyle of most of the working adults, this project was brought up to give a convenient in time zone to them. In the implementation of this project, a number of software has been utilized, which include Maya 2009 for 3D modelling and Flash CS5 for the integration. In a nutshell, this report is prepared so that it can be benefits to those who intended to do research on this field and also inspire those that plan to continue in enhancing this project.

ABSTRAK

Tujuan utama projek ini adalah untuk membangunkan sebuah aplikasi *virtual tour* dengan mengintegrasikan teknologi pengenalan suara serta teknologi pengesanan wajah demi mewujudkan pengalaman yang berbeza daripada yang tradisional kepada pengguna. Teknologi pengenalan suara digunakan untuk tujuan navigasi manakala teknologi pengesanan wajah berfungsi sebagai elemen pelacakan kepala. Selain itu, rumah model 3D yang diperkenalkan adalah rumah baru di mana proses pembinaan masih dijalankan. Oleh itu, tujuan projek ini adalah untuk memberikan pihak pemaju perumahan dari Rah Properties Corporation idea inovasi untuk mempromosikan projek residensi baru dengan kos yang rendah. Pada zaman teknologi ini, majoriti orang dewasa mengamalkan gaya hidup yang sibuk bekerja. Oleh itu, projek ini diperkenalkan supaya mereka yang berminat bolehlah melayari web dan mencapai aplikasi ini pada bila-bila masa dan di mana-mana tempat sahaja. Selain itu, beberapa jenis perisian telah digunakan dalam pelaksanaan projek ini. Perisian-perisian yang meliputi termasuklah Maya 2009 dan Flash CS5. Secara ringkasnya, laporan ini disediakan agar mereka yang bertujuan untuk melakukan kajian terhadap bidang ini dapat mendapat manfaat serta pada mereka yang merancang untuk meneruskan projek ini berjaya mendapat inspirasi daripada projek ini.

TABLE OF CONTENTS

CHAPTER	SUBJECT	PAGE
	DECLARATION	i
	DEDICATION	ii
	ACKNOWLEDGEMENT	iii
	ABSTRACT	iv
	ABSTRAK	v
	TABLE OF CONTENTS	vi - x
	LIST OF TABLES	xi
	LIST OF FIGURES	xii – xiii
	LIST OF APPENDIX	xiv
CHAPTER I	INTRODUCTION	
	1.1 Project Background	1
	1.2 Problem Statements	2
	1.3 Objectives	3
	1.4 Scope	4
	1.5 Project Significance	4

CHAPTER	SUBJECT	PAGE
	1.6 Conclusion	5
CHAPTER II	LITERATURE REVIEW AND PROJECT METHODOLOGY	
2.1	Introduction	6
2.2	Domain	6
	2.2.1 Virtual Reality	7
	2.2.2 Speech Navigation	8
	2.2.3 Face Recognition	9
2.3	Existing System	9
	2.3.1 Comparison of Existing System	10
	2.3.1.1 Model Home Virtual Tour by 3cim	10
	2.3.1.2 Virtual Tour by ROSEHAVEN Homes	11
	2.3.1.3 Virtual Tour by Golden Ocala	11
2.4	Project Methodology	13
	2.4.1 Planning Phase	14
	2.4.2 Analysis Phase	14
	2.4.3 Design Phase	14
	2.4.4 Implementation Phase	15
	2.4.5 Testing and Evaluation Phase	15
2.5	Project Requirement	15
	2.5.1 Software Requirement	15
	2.5.2 Hardware Requirement	16
2.6	Conclusion	16

CHAPTER	SUBJECT	PAGE
CHAPTER III	ANALYSIS	
3.1	Current Scenario Analysis	17
3.2	Requirement Analysis	19
3.2.1	Project Requirement	19
	3.2.1.1 Requirement Gathering	19
	3.2.1.2 Technique	20
3.2.2	Software Requirement	23
	3.2.2.1 Autodesk Maya 2009	24
	3.2.2.2 Sony Sound Forge 9	24
	3.2.2.3 Adobe Illustrator CS4	24
	3.2.2.4 Adobe Flash CS5	25
	3.2.2.5 Flash Player 10.1	25
	3.2.3 Hardware Requirement	25
	3.2.3.1 Workstation	26
	3.2.3.2 Webcam	26
	3.2.3.3 Microphone	26
	3.2.3.4 Mouse	27
3.3	Project Schedule and Milestones	27
3.4	Conclusion	30

CHAPTER	SUBJECT	PAGE
CHAPTER IV	DESIGN	
4.1	Introduction	31
4.2	System Architecture	31
4.3	Preliminary Design	32
	4.3.1 Interactive Storyboard Design	32
4.4	User Interface Design	36
	4.4.1 Navigation Design	36
	4.4.2 Input Design	38
	4.4.3 Output Design	40
	4.4.4 Metaphors	41
4.5	Conclusion	42
CHAPTER V	IMPLEMENTATION	
5.1	Introduction	43
5.2	Media Creation	44
	5.2.1 Production of Text	44
	5.2.2 Production of Graphic	45
5.3	Media Integration	46
5.4	Product Configuration Management	48
	5.4.1 Configuration Environment Setup	48
	5.4.2 Version Control Procedure	50
5.5	Implementation Status	51
5.6	Conclusion	52

CHAPTER	SUBJECT	PAGE
 CHAPTER VI TESTING AND EVALUATION		
6.1	Introduction	53
6.2	Test Plan	54
	6.2.1 Test User	54
	6.2.2 Test Environment	55
	6.2.3 Test Schedule	56
	6.2.4 Test Strategy	56
6.3	Test Implementation	57
	6.3.1 Test Description	58
	6.3.2 Test Data	60
	6.3.3 Test Results and Analysis	63
	6.3.4 Analysis Testing	69
6.4	Conclusion	70
 CHAPTER VII PROJECT CONCLUSION		
7.1	Observation on Weakness and Strengths	72
	7.1.1 Weakness	72
	7.1.2 Strengths	73
7.2	Proportion for Improvement	73
7.3	Contribution	74
7.4	Conclusion	74
	 REFERENCES	 76

LIST OF TABLES

TABLE	TITLE	PAGE
Table 2.1:	Comparison of Existing System and OpTour	12
Table 4.1:	Input Design of Navigation	39
Table 4.2:	Input Design of Voice Command	39
Table 4.3:	Metaphor Design Table	41
Table 5.1:	Version Control Procedure	50
Table 5.2:	Implementation Status	51
Table 6.1:	Test Schedule	56
Table 6.2:	Expected Results of Functionality Testing	58
Table 6.3:	Questions for Acceptance Testing	59
Table 6.4:	Functionality Testing Test Results	60
Table 6.5:	Acceptance Testing Test Results	61
Table 6.6:	Functionality Testing Test Results	64
Table 6.7:	List of Questions for Acceptance Testing	64

LIST OF FIGURES

DIAGRAM	TITLE	PAGE
Figure 2.1:	Model Home Virtual Tour of Dining Room	10
Figure 2.2:	Virtual Tour of Living Room	11
Figure 2.3:	Virtual Tour of Grand Room	12
Figure 2.4:	SDLC Model	13
Figure 3.1:	Flowchart of system navigation in Golden Ocala virtual tour system	18
Figure 3.2:	Sofa set rendered with Mental Ray Technique	20
Figure 3.3:	Frame by frame technique in 3D house model	21
Figure 3.4:	FaceDetector_Camera.as	22
Figure 3.5:	VoiceGesture.as	23
Figure 3.2:	Gantt chart	29
Figure 4.2:	Scene 1 – Instruction Interface	33
Figure 4.3:	Scene 2 – Main Menu Interface	34
Figure 4.4:	Scene 3 – House “A” Interface	35
Figure 4.5:	Main Flow Chart	37
Figure 4.6:	House “A” Navigation Flow Chart	38
Figure 4.7:	Input Design Diagram	39
Figure 4.8:	Walkthrough Flow Chart	40
Figure 4.9:	Output Design Diagram	40
Figure 4.10:	OpTour Overall Look and Feel Design	42
Figure 5.1:	Gabriola Text	44
Figure 5.2:	2D Images Production Process	45
Figure 5.3:	3D Images Production Process	46
Figure 5.4:	Summary of Media Integration	47
Figure 5.5:	Adobe Flash Player v10.3 Installation Setup	48
Figure 5.6:	Adobe Flash Player Installation Complete	49
Figure 5.7:	Adobe Flash Player Settings	49
Figure 6.1:	Pie Chart of Acceptance Testing Result for Q1	65
Figure 6.2:	Pie Chart of Acceptance Testing Result for Q2	66
Figure 6.3:	Pie Chart of Acceptance Testing Result for Q3	66

Figure 6.4:	Pie Chart of Acceptance Testing Result for Q4	67
Figure 6.5:	Pie Chart of Acceptance Testing Result for Q5	67
Figure 6.6:	Pie Chart of Acceptance Testing Result for Q6	68
Figure 6.7:	Pie Chart of Acceptance Testing Result for Q7	68
Figure 6.8:	Pie Chart of Acceptance Testing Result for Q8	69
Figure 6.9:	Cumulative Frequency of the Results	70

LIST OF APPENDIX

APPENDIX	TITLE	PAGE
Appendix A	List of User Acceptance Test Result	

CHAPTER I

INTRODUCTION

1.1 Project Background

The project that will be developed is a virtual reality application. The application, which entitled “OpTour”, is an application that provides user a new way of experiencing virtual environment with speech recognition to navigate and tour in a 3D new model house. The target users are adults in the age of 18 and above.

OpTour is a 3D virtual walk-through application with the integration of face recognition and speech recognition technology. In this project, two types of 3D model houses of the current progressing Three Storey Semi D project by Rah Properties Corporation, an estimated to be complete by November 2012 property will be created using the Autodesk Maya Software. Then, it will be integrated with Adobe Flash for the speech recognition and face recognition. Throughout the experience of OpTour, user will be prompt to use speech to navigate to their desire location and also by using their face to look around in the virtual environment by turning their face from side-to-side. Besides, this application can also be implemented online, so that user are able to view based on their place of interest and their convenient of time.

Currently, there are many walkthrough of model houses in the market over the globe, which includes Model Home Virtual Tour by 3cim, Virtual Tour by ROSEHAVEN Homes and Virtual Tour by Golden Ocala. However, the technology of speech and face recognition was not implemented yet.

Besides, the problem that might be arising from the current existing applications includes the lack of interactivity experience and walkthrough. Most of the working adults prefer to visit a show unit rather than using the existing application which is prepared to be used as their convenient. In this case, the existing application seems to be neglected and unpopular for its objective cannot be achieved. Therefore, it can be obviously seen that this project will be able to produce a very useful tool and a different type of experience to user.

1.2 Problem Statement(s)

The current trend of promoting a new develop property is most likely by distributing brochures, displaying miniature of houses and also show house unit that available after completion. However, most people that are affordable to purchase a new property are working adults, where they will only be free to look and compare of the property by weekend. These can be very inconvenient to them in order to make comparison by travelling from a location to another desire property's location.

Nowadays, working adults seems to be busy with their everyday routine and it is quite an agony for them when comes to the decision of getting a new property. This is because they need to make plenty of comparison before placing an investment. According to the previous traditional ways of making comparison, they have to travel from one location to another location, which is time consuming and cost petrol expenses.

Besides, on the perspective of the property developer, gaining sales after the property completion date is a large and high risk project. Mostly, developer releases the property for sales before its completion date, so that they will not bear on too many debts and risk. In this case, how can the developer convince people to start paying for a property which is just in progress? The answer is by using OpTour, because through this, developer can promote and advertise of the new project all over the world and get feedback as well.

Therefore, this project is developed in order to provide user a new way of experiencing of virtual house, a convenient way across time zone to view an interested unit and also a new way of promoting new residency projects.

1.3 Objective

There are several objectives that have been ascertained in this project, which are as listed below.

1. To do a research on virtual reality application integrating with speech and face recognition.
2. To produce an application that provides user a clear and real view of a manufacture house that provides user a convenient of time zone by viewing the house through internet.
3. To measure the functionality of the application specifically in face and voice recognition interaction.
4. To measure user acceptance level on the application.

1.4 Scope

Several scopes and limitation of the project have been determined as followed.

1. Target User:
 - a. This product is suitable for user in the age of 18 and above that has the ability to spend or in other words consumer.

2. Scope of Work:
 - a. Preparing a master plan or proposal.
 - b. Establishing project objective/goal, ensure project has a clear target.
 - c. Gather information and perform thorough analysis on project justification.
 - d. Drawing up a schedule - plan the timeline and resources including information, equipment and facilities.
 - e. Design and draft out the storyboard.
 - f. Develop and start modelling.
 - g. Integrates and codes.
 - h. Prepare test plan and perform full testing to ensure zero defect.
 - i. Package and present the project.

3. Limitation of the Project:
 - a. Language – this project will be presented in English, it might not suitable to be use in certain country.
 - b. Time – due to time constraint, only one out of two types of model house will be partially modelled and functioning.

1.5 Project Significant

This project will be able to contribute to the research of virtual reality by not limited to in integrating with speech and face recognition. Any researcher that

intended to study and further research in this area are able to take this project as references or guidelines to start his/her research.

Besides, this project is able to allow user a convenient in time zone by viewing a house on internet without attending a show house unit in real time. It allows user to experience the environment of the house by speech and face recognition without using of heavy head mounted tools. These are able to provide user a saving in terms of money and time. For user no longer need to attend to show unit from one place to another, wasting time and high petrol cost.

1.6 Conclusion

The expectation from this project is to develop a virtual reality application with the integration of speech and face recognition that is able to fulfil all the objectives stated above and is able to be commercialized.

Next in chapter II, the literature review of the comparison between the existing system and the approach of the project methodology will be discussed in details.

CHAPTER II

LITERATURE REVIEW & PROJECT METHODOLOGY

2.1 Introduction

In this chapter, the reviews and aspect of several applications that exist in the market will be compared and analysed. The comparison will be made based on the specs provided by the existing system and the enhancement added to the project developed application. Besides, the methodology that used in development throughout this project will also be discussed in details. In technical wise, the hardware and software requirement will be mentioned in this chapter as well.

2.2 Domain

According to Tim, Mike and Matt (2006), the goal of virtual environment development is to allow a particular user to view or unveil a location with minimum difficulty. They also mention about how virtual environment is able to benefit to user

by providing so much convenient to user to view a property on sale without wasting time or any excessive travelling fees. Therefore, OpTour is an application that provides user a 3D environment platform with the head movement and speech recognition as navigation. In OpTour, it allows user to view through a show house model in different angle and views hence provides user a virtual environment walkthrough. It is able to be interacted for information requirements like square feet and price.

2.2.1 Virtual Reality

Virtual Reality is an environment that represented or simulated by computer and that the simulation is a real or imaginary world, where a particular person is able to participate and interactive with the environment through different stage of immersion. This statement is supported by Courter, Springer, Neumann, Cruz-Neira and Reiners (2010).

As mention above, virtual reality can be classified with different stages of immersion. There are three levels of immersion that have been classified so far, which are fully immersive, semi-immersive and non-immersive. In brief, fully immersive systems used head mounted devices (HMD) or any other head-coupled display to let user totally immerse into the computer generated world as known as imaginary world. This type of immersion is a good experience to user but to purchase the power technology and devices, this is consequently an expensive project. Semi-immersive systems are an integration of high performance graphics computing system and a large screen projector system or any system that is able to produce equivalent effect of a large screen. This type of system is able to provide user great resolution of virtual experience. However, when a particular user view moved out of the screen, they will immediately exit from the virtual environment. Besides, a large screen or projector is a high cost and need high maintenance system.

Therefore, OpTour uses the non-immersive system where 3D virtual environment is graphically displayed on the screen or desktop of computer and